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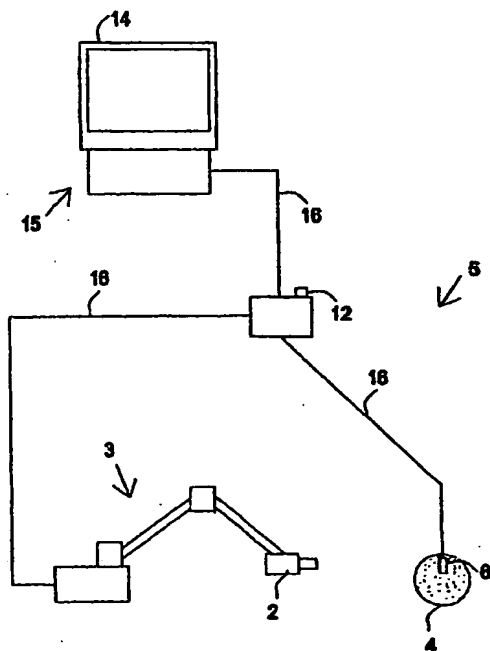
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[Continued on next page]

(54) Title: METHOD AND ARRANGEMENT FOR MEDICAL X-RAY IMAGING AND RECONSTRUCTION FROM SPARSE DATA



$$p(x|m) = \frac{p_{pr}(x)p(m|x)}{p(m)} \quad (I)$$

(57) Abstract: The invention relates to a medical X-ray device 5 arrangement for producing three-dimensional information of an object 4 in a medical X-ray imaging medical X-ray device arrangement comprising an X-ray source 2 for X-radiating the object from different directions and a detector 6 for detecting the X-radiation to form projection data of the object 4. The medical X-ray device 5 arrangement comprises: means 15 for modelling the object 4 mathematically independently of X-ray imaging -and means 15 for utilizing said projection data and said mathematical modelling of the object in Bayesian inversion based on Bayes' formula (I) to produce three-dimensional information of the object, the prior distribution $p_{pr}(x)$ representing mathematical modelling of the object, the object image vector x , which comprise values of the X-ray attenuation coefficient inside the object, m representing projection data, the likelihood distribution $p(m|x)$ representing the X-radiation attenuation model between the object image vector x and projection data m , $p(m)$ being a normalization constant and the posteriori distribution $p(x|m)$ representing the three-dimensional information of the object 4.

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SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,
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International application No.

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A. CLASSIFICATION OF SUBJECT MATTER

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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: A61B, G06T, G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI, INSPEC, MEDLINE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	"HYBRID INTERPOLATIONS TO ENHANCE 3 D MEDICAL IMAGE RECONSTRUCTION." in: CHIN. J. MED. BIOL. ENG. (TAIWAN), CHINESE JOURNAL OF MEDICAL AND BIOLOGICAL ENGINEERING, March 2000, Biomed. Eng. Soc. Republic of China, Taiwan Don-Lin Yang et al. ISSN 1019-0465 retrieved on 2003-11-17	1-38
A	DATABASE INSPEC/IEE "TOTAL VARIATION NORM FOR THREE-DIMENSIONAL ITERATIVE RECONSTRUCTION IN LIMITED VIEW ANGEL TOMOGRAPHY." Phys. Med. Biol. (UK), Physics in Medicine and Biology, March 2001, IOP Publishing, UK. ISSN 0031-9155 vol 46, nr. 3	1-38

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

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PCT/FI 03/00625

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>"A scale invariant bayesian method to solve linear inverse problems." Mohammad-Djafari et al. Presented at the 13th International Workshop on Maximum Entropy and Bayesian Methods (MaxEnt93) USA 1995 US 2002/0015006 A1 Abstract</p> <p>--</p>	1-38
A	<p>WO 0077719 A1 (THE REGENTS OF THE UNIVERSITY OF CALIFORNIA), 21 December 2000 (21.12.00), figure 1, abstract</p> <p>--</p>	1-38
A	<p>DATABASE INSPEC/IEE "THREE DIMENSIONAL VOLUMETRIC MODELING OF THE INTERNAL BRAIN STRUCTURE USING MAGNETIC RESONANCE..." 2001 Conference Proceedings of the 23rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Istanbul, Turkey, 25-28 Oct. International Conference of the IEEE Engineering in Medicine and Biology Society, Istanbul, TURKEY, 25-28 Oct. 2001. Sallam A A et al. Abstract</p> <p>--</p>	1-38
A	<p>DATABASE INSPEC/IEE "RECONSTRUCTION OF 3-D LEFT VENTRICULAR MOTION FROM PLANAR TAGGED CARDIAC MR IMAGES: AN ESTIMATION THEORETIC APPROACH." IEEE Trans. Med. Imaging (USA, IEEE Transactions on Medical imaging, Dec. 1995, IEEE, USA Denney TS et al ISSN 0278-0062 Abstract</p> <p>--</p> <p>-----</p>	1-38

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INTERNATIONAL SEARCH REPORT

Information on patent family members

06/09/03

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0077719 A1	21/12/00	AU 5315200 A	02/01/01
		US 6353688 B	05/03/02
		US 6490374 B	03/12/02
		US 2002044698 A	18/04/02

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